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What is claimed is :

1. A computer implemented method for development profile simulation comprising:

calculating optical intensities in a photosensitive resist;

calculating a spatial average value of the optical intensities;

reading a measured changing ratio of a dissolution rate of the photosensitive resist relating to an alkaline concentration changed by at least one of exposure dose on the photosensitive resist, a position in the thickness direction of the photosensitive resist and an alkaline concentration of developer for the photosensitive resist;

obtaining a calculated dissolution rate by using the spatial average value and the measured changing ratio; and

predicting a pattern shape of the photosensitive resist from the calculated dissolution rate.

2. The method of claim 1, wherein the optical intensities is an aerial image intensity.

3. The method of claim 1, wherein the optical intensities is concentration of photoreaction products.

4. The method of claim 1, wherein the measured changing ratio of the dissolution rate is calculated from a logarithm of a measured dissolution rate to the alkaline concentration.

5. The method of claim 1, wherein the measured changing ratio of the dissolution rate is calculated from a logarithm of a measured dissolution rate to a logarithm of the alkaline concentration.

6. The method of claim 1, wherein the spatial average value is calculated in an area where the photosensitive resist dissolves in initial stage of development.

7. The method of claim 1, wherein the spatial average is calculated in reference positions moving along development time, which is different from the position where the pattern shape of the photosensitive resist is predicted.

8. A computer implemented method for development profile simulation comprising:

calculating optical intensities in a photosensitive resist;

calculating a spatial average value of the optical intensities;

obtaining a changing ratio of a logarithm of a measured dissolution rate to an alkaline concentration of developer for the photosensitive resist or the changing ratio of the logarithm of the measured dissolution rate to a logarithm of the alkaline concentration of developer for the photosensitive resist;

obtaining a calculated dissolution rate by using the spatial average value and the calculated changing ratio of the

logarithm of the measured dissolution rate to alkaline concentration of a developer or the calculated changing ratio of the logarithm of the measured dissolution rate to the logarithm of an alkaline concentration of the developer; and

predicting a pattern shape of the photosensitive resist by using the calculated dissolution rate.

9. The method of claim 8, wherein the optical intensities is an aerial image intensity.

10. The method of claim 8, wherein the optical intensities is concentration of photoreaction products.

11. The method of claim 8, wherein the spatial average value is calculated in an area where the photosensitive resist dissolves in initial stage of development.

12. The method of claim 8, wherein the spatial average is calculated in reference positions moving along development time, which is different from the position where the pattern shape of the photosensitive resist is predicted.

13. A computer implemented method for development profile simulation comprising:

calculating optical intensities in a photosensitive resist;

calculating a spatial average value of the optical intensities

in an area where the photosensitive resist dissolves in initial stage of development;

reading a measured changing ratio of a dissolution rate of the photosensitive resist relating to an alkaline concentration;

obtaining a calculated dissolution rate by using the spatial average value and the measured changing ratio; and

predicting a pattern shape of the photosensitive resist by using the calculated dissolution rate.

14. The method of claim 13, wherein the optical intensities is an aerial image intensity.

15. The method of claim 13, wherein the optical intensities is concentration of photoreaction products.

16. The method of claim 13, wherein the measured changing ratio of the dissolution rate is calculated from a logarithm of a measured dissolution rate to the alkaline concentration.

17. The method of claim 13, wherein the measured changing ratio of the dissolution rate is calculated from a logarithm of a measured dissolution rate to a logarithm of the alkaline concentration.

18. The method of claim 13, wherein the spatial average is calculated in reference positions moving along development

time, which is different from the position where the pattern shape of the photosensitive resist is predicted.

19. A computer implemented method for development profile simulation comprising:

calculating optical intensities in a target position to predict a pattern shape of a photosensitive resist and reference positions moving along development time;

calculating spatial average values of the optical intensities in the reference positions;

reading a measured changing ratio of a dissolution rate of the photosensitive resist relating to the alkaline concentration;

obtaining calculated dissolution rates by using the spatial average values in the reference positions and the measured changing ratio; and

predicting the pattern shape of the photosensitive resist in the target position by using the calculated dissolution rates and the optical intensities in the target position.

20. The method of claim 19, wherein the optical intensities is an aerial image intensity.

21. The method of claim 19, wherein the optical intensities is concentration of photoreaction products.

22. The method of claim 19, wherein the measured changing ratio of the dissolution rate is calculated from a logarithm of a measured dissolution rate to the alkaline concentration.

23. The method of claim 19, wherein the measured changing ratio of the dissolution rate is calculated from a logarithm of a measured dissolution rate to a logarithm of the alkaline concentration.

24. The method of claim 19, wherein the spatial average value is calculated in an area where the photosensitive resist dissolves in initial stage of development.

25. A computer program product for controlling a computer system so as to simulate development profile, the computer program product comprising:

instructions configured to calculate optical intensities in a photosensitive resist within the computer system;

instructions configured to calculate a spatial average value of the optical intensities within the computer system;

instructions configured to read a measured changing ratio of a dissolution rate of the photosensitive resist relating to an alkaline concentration changed by at least one of exposure dose on the photosensitive resist, a position in the thickness direction of the photosensitive resist and an alkaline concentration of developer for the photosensitive resist within

the computer system;

instructions configured to obtain a calculated dissolution rate by using the spatial average value and the measured changing ratio within the computer system; and

instructions configured to predict a pattern shape of the photosensitive resist from the calculated dissolution rate within the computer system.

26. A computer program product for controlling a computer system so as to simulate development profile, the computer program product comprising:

instructions configured to calculate optical intensities in a photosensitive resist within the computer system;

instruction configured to calculate a spatial average value of the optical intensities within the computer system;

instruction configured to obtain a changing ratio of a logarithm of a measured dissolution rate to an alkaline concentration of developer for the photosensitive resist or the changing ratio of the logarithm of the measured dissolution rate to a logarithm of the alkaline concentration of the developer for the photosensitive resist within the computer system;

instruction configured to obtain a calculated dissolution rate by using the spatial average value and the calculated changing ratio of the logarithm of the measured dissolution rate to alkaline concentration of the developer or the

calculated changing ratio of the logarithm of the measured dissolution rate to the logarithm of the alkaline concentration of the developer within the computer system; and

instruction configured to predict a pattern shape of the photosensitive resist by using the calculated dissolution rate within the computer system.

27. A computer program product for controlling a computer system so as to simulate development profile, the computer program product comprising:

instruction configured to calculate optical intensities in a photosensitive resist within the computer system;

instruction configured to calculate a spatial average value of optical intensities in an area where the photosensitive resist dissolves in initial stage of development within the computer system;

instruction configured to read a measured changing ratio of a dissolution rate of the photosensitive resist relating to an alkaline concentration within the computer system;

instruction configured to obtain a calculated dissolution rate by using the spatial average value and the measured changing ratio within the computer system; and

instruction configured to predict a pattern shape of the photosensitive resist by using the calculated dissolution rate within the computer system.

28. A computer program product for controlling a computer system so as to simulate development profile, the computer program product comprising:

instruction configured to calculate optical intensities in a target position to predict a pattern shape of a photosensitive resist and reference positions moving along development time within the computer system;

instruction configured to calculate spatial average values of the optical intensities in the reference positions within the computer system;

instruction configured to read a measured changing ratio of a dissolution rate of the photosensitive resist relating to the alkaline concentration within the computer system;

instruction configured to obtain calculated dissolution rates by using the spatial average values in the reference positions and the measured changing ratio within the computer system; and

instruction configured to predict the pattern shape of the photosensitive resist in the target position by using the calculated dissolution rates and the optical intensities in the target position within the computer system.

29. A computer implemented method for mask pattern data correction comprising:

reading a designed pattern data in a photosensitive resist, a mask pattern data, and a measured changing ratio of

a dissolution rate of the photosensitive resist relating to an alkaline concentration changed by at least one of exposure dose on the photosensitive resist, a position in the thickness direction of the photosensitive resist and an alkaline concentration of developer for the photosensitive resist;

calculating optical intensities in the photosensitive resist by using the mask pattern data;

calculating a spatial average value of the optical intensities;

obtaining a calculated dissolution rate by using the spatial average value and the measured changing ratio;

predicting a pattern shape of the photosensitive resist from the calculated dissolution rate; and

optimizing the mask pattern data so as to make the calculated pattern shape similar to the designed pattern data in the photosensitive resist.

30. A computer implemented method for mask pattern data correction comprising:

obtaining a designed pattern data in a photosensitive resist, a mask pattern data, and a calculated changing ratio of a logarithm of a measured dissolution rate to an alkaline concentration of developer for the photosensitive resist or the calculated changing ratio of the logarithm of the measured dissolution rate to a logarithm of the alkaline concentration of developer for the photosensitive resist;

calculating optical intensities in the photosensitive resist by using the mask pattern data;

calculating a spatial average value of the optical intensities;

obtaining a calculated dissolution rate by using the spatial average value and the measured changing ratio;

predicting a pattern shape of the photosensitive resist from the calculated dissolution rate; and

optimizing the mask pattern data so as to make the calculated pattern shape similar to the designed pattern data in the photosensitive resist.

31. A computer-implemented method for mask pattern data correction comprising:

reading a designed pattern data in a photosensitive resist, a mask pattern data, and a measured changing ratio of a dissolution rate of the photosensitive resist relating to an alkaline concentration;

calculating optical intensities in the photosensitive resist by using the mask pattern data;

calculating a spatial average value of optical intensities in an area where the photosensitive resist dissolves in initial stage of development;

obtaining a calculated dissolution rate by using the spatial average value and the measured changing ratio;

predicting a pattern shape of the photosensitive resist from

the calculated dissolution rate; and

optimizing the mask pattern data so as to make the calculated pattern shape similar to the designed pattern data in the photosensitive resist.

32. A computer implemented method for mask pattern data correction comprising:

reading a designed pattern data in a photosensitive resist, a mask pattern data, and a measured changing ratio of a dissolution rate of the photosensitive resist relating to the spatial average value;

calculating optical intensities in a target position of the photosensitive resist and reference positions moving along development time by using the mask pattern data;

calculating a spatial average value of the optical intensities in the reference positions;

obtaining a calculated dissolution rate by using the spatial average value in the reference positions and the measured changing ratio;

predicting a pattern shape of the photosensitive resist by using the calculated dissolution rate and the optical intensities in the target position; and

optimizing the mask pattern data so as to make the calculated pattern shape similar to the designed pattern data in the photosensitive resist.